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Social Anxiety and Subtypes of Empathy: The Moderating Influence of Biological Sex

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SOCIAL ANXIETY AND SUBTYPES OF EMPATHY:

THE MODERATING INFLUENCE OF BIOLOGICAL SEX

by

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ABSTRACT

Only a few studies have examined relationships between social anxiety and subtypes of empathy. Findings are mixed. The present study examined social anxiety severity on a continuum and how it related to affective and cognitive empathy in 684 nonpsychiatric adults (77% female). Participants completed an online battery of measures that included: a self-report measure of social anxiety severity (Fear of Negative Evaluation), a self-report measure with subscales for affective and cognitive empathy (Interpersonal Reactivity Index), and a behavioral measure of cognitive empathy (Reading the Mind in the Eyes Task; MIE). After statistically covarying for general anxiety severity, biological sex moderated the relationship between social anxiety severity and performance on the MIE task. In women, a higher severity of social anxiety related to better performance on the MIE. This relationship was not statistically significant in men. IRI subscale scores did not show significant main effects or interactions with sex in relation to social anxiety. The findings suggest a possible difference in how each sex experiences and/or develops social anxiety. This has implications for assessment and treatment. Future research should examine these relationships in more diverse psychiatric samples.

Dedication

For my mom and dad, who encouraged me to work towards my dreams, taught me to look at the world with a curious and eager mind, and inspired me to be the best version of myself.

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INTRODUCTION

The trait of social anxiety is a persistent fear of one or more social situations in which embarrassment might occur. Furthemore, the fear is disproportionate to the actual threat as determined by the person's cultural norms (American Psychological Association, 2013). Social anxiety becomes a disorder (i.e., social anxiety disorder [SAD]) when the related fear, anxiety, and/or avoidance is persistent for at least six months and results in significant distress or functional impairment (American Psychological Association, 2013). Since social anxiety often includes avoidance of social situations, individuals experiencing chronic social anxiety may differ in social cognition. Social cognition is a broad category which encompasses affective empathy, cognitive empathy, and theory of mind. Affective empathy (i.e., "empathic concern" or "emotional empathy") is a response to witnessing another's emotions that involves basic emotion recognition and personal emotional reactions (Tone &Tully, 2014). At a healthy level, this can lead to appropriate compassionate reactions to other's emotional states. Theory of mind is one's capacity to attribute mental states. It allows people to recognize that others may have different views from one's own (Flavell, 1999). Cognitive empathy refers to the ability to accurately assess what another individual is thinking or feeling. This overlaps the construct of theory of mind (Tone &Tully, 2014; Blair, 2005). For the purposes of this manuscript, "cognitive empathy" will be used to describe theory of mind, emotional intelligence, empathic or emotional accuracy, and variations thereof. "Affective empathy" will be used to describe empathic concern and emotional reactions to witnessing another's emotions. At a population level, it appears that females experience a greater level of affective and cognitive empathy than males (Doherty, Orimoto, Singelis, Hatfield, & Hebb, 1995; Michalska, Kinzler, & Decety, 2013; Christov-Moore, Simpson, Coudé, Grigaityte, Iacoboni, & Ferrari, 2014). However, this difference is

more pronounced for affective than cognitive empathy (Christov-Moore, et al., 2014). Women also display a higher prevalence of SAD than men in the general population, with an odds ratio ranging from 1.5 to 2.2 (American Psychiatric Association, 2013).

Theoretically, there may be a relationship between affective or cognitive empathy and social anxiety. That is, chronic fear of embarrassment in social situations could either affect or be affected by one's ability to accurately infer thoughts and emotions of others. Potentially, social anxiety may relate to empathy such that individuals higher in social anxiety and more aware of those around them have heightened perceptive and compassionate abilities (i.e., greater cognitive and affective empathy). Alternatively, social anxiety may relate to empathy such that individuals higher in social anxiety and more aware of their surroundings have decreased cognitive and affective empathy, possibly due to a subconscious avoidance of others' facial cues and body language.

Several studies have examined these relationships in nonpsychiatric and SAD samples. Tibi-Elhanany and Shamay-tsoory's (2011) study focused on social anxiety, general anxiety, and empathy. They found that a nonpsychiatric group higher in social anxiety exhibited higher cognitive empathy than the group lower in social anxiety. Researchers also controlled for general anxiety. However, when not controlling for general anxiety, the same group difference was found. In this instance the difference was with affective, rather than cognitive, empathy. Other research reported that nonpsychiatric participants with higher levels of social anxiety also showed enhanced cognitive empathy in reaction to social exclusion. Nonetheless, they did not measure affective empathy (Auyeung & Alden, 2016). Additional findings on cognitive empathy showed that individuals with SAD displayed reduced cognitive empathy compared to nonpsychiatric individuals (Jacobs, Snow, Geraci, Vythilingam, Blair, Charney, … & Blair,

2008). Another study found that compared to nonpsychiatric participants, individuals with SAD exhibited reduced affective empathy in response to viewing positive but not negative emotions of others (Morrison, Mateen, Brozovich, Zaki, Goldin, Heimberg, & Gross, 2016). No group differences were found for cognitive empathy,

Overall, the existing research findings on relationships of affective and cognitive empathy with social anxiety is mixed. One factor related to this inconsistency appears to be the sample in which social anxiety severity was examined. Findings with a nonpsychiatric sample were consistently in the direction of higher empathy relating to higher social anxiety. Alternatively, findings examined at a group level in those diagnosed with SAD were consistently in the opposite direction in which the SAD group showed reduced empathy. One other factor that may explain the difference in findings with empathy subtypes among the nonpsychiatric studies is the moderating influence of biological sex. While none of the studies reviewed thus far have examined this moderation, one study in a nonpsychiatric sample found that women with higher levels of social anxiety performed better on two behavioral cognitive empathy tasks than women with lower levels of social anxiety (Sutterby, Bedwell, Passler, Deptula, & Mesa, 2012). No relationships were found in men. This supports a positive relationship between cognitive empathy and social anxiety that may be specific to women. The study was limited by a small sample size. One possible reason this finding occurred is due to a greater presence of perceptive abilities in women that are amplified by social anxiety. Theoretically, social anxiety may only relate to increased empathic abilities in women because women are more impacted by social anxiety. It appears that Sutterby and colleagues (2012) is the only study thus far that examined potential moderation of biological sex on empathy and social anxiety in any type of sample.

The present study aimed to explore social anxiety on a continuum and how it relates to affective and cognitive empathy. Clarifying whether biological sex moderates these relationships using a large sample is critical for this area of research to progress and has important clinical implications. For example, early impairments in affective or cognitive empathy could impede socio-emotional development in children (Colonnesi, Nikolić, de Vente, & Bögels, 2017). These impedements can lead to chronic social anxiety due to peer reactions to underdeveloped social skills. In addition, the diagnostic criteria, assessment process, and psychosocial treatments for SAD would benefit from better understanding these relationships. This is especially the case if they consistently differ between the biological sexes.

The current study examined a large nonpsychiatric sample to assess relationships between dimensional social anxiety, affective and cognitive empathy, and biological sex. It is hypothesized that the relationships will differ between the sexes. Specifically, after covarying for general anxiety, scores on measures reflecting both types of empathy will positively relate to social anxiety severity. It is hypothesized that these relationships will show smaller effect sizes or be absent in men as compared to women, based on the one study that examined this moderation (Sutterby et al., 2012).

METHODS

Participants

The data used in this study was collected as part of a larger online study at Georgia State University. The original sample consisted of 793 undergraduate students enrolled in introductory psychology courses. Of these, 81 were excluded for completing the assessment at a faster speed than the majority of the group (< 10th%ile of 26 min; mean = 45.38 min; SD = 22.34), to reduce the possibility of random responding as well as poor attention to item content. An additional 28 participants were excluded as statistical outliers on one or more measures (see Results section). The final sample consisted of 684 participants (77% female). The mean age was 21.26 (SD = 4.51; range 18 to 52). Just under half (46.6%) self-identified their race as ‘‘White/ Caucasian,’’ while 30.5% identified as ‘‘Black/African American,’’ 9.3% as ‘‘Asian American,’’ 6.6% as ‘‘Biracial/Multicultural,’’ 0.7% as ‘‘American Indian/Native American,’’ 0.3% as ‘‘Native Hawaiian/Pacific Islander,’’ and 6.0% as ‘‘Other.’’ Independent of race, 8.4% identified their ethnicity as Latino(a)/Hispanic.

Measures

Fear of Negative Evaluation Scale (FNE). This is a 30-item self-report assessment used to measure social anxiety (Watson & Friend, 1969). Each item contains a statement about social anxiety and asks participants to decide whether each statement is true or false. Higher scores indicate greater social anxiety (Watson & Friend, 1969). In our sample, the FNE scale had excellent internal reliability (α =.93).

Interpersonal Reactivity Index (IRI). This is a 28-item multi-dimensional self-report assessment of empathy comprised of four subscales: Empathic Concern, Perspective Taking, Fantasy, and Personal Distress (Davis, 1980). The items are answered on a 5-point Likert scale

ranging from (0 = “Does not describe me well” to 4 = “Describes me very well”). The responses are added together and higher scores indicate greater levels of empathy for each subtype. The Empathic Concern (EC) subscale measures feelings of concern and sympathy toward others and the Perspective-Taking (PT) subscale measures ability to accurately identify thoughts and emotions experienced by others (Davis, 1980). The Personal Distress subscale and Fantasy subscale were excluded from the study because they do not have strong specific associations with affective or cognitive empathy. The EC subscale was used to evaluate affective empathy while the PT subscale was used to measure cognitive empathy. In our sample, the internal reliability was acceptable for EC and PT (α = .73 for each).

Depression Anxiety Stress Scale (DASS). This is a 42-item self-report measure that evaluates anxiety, depression, and stress levels of the past week (Ritschel, Tone, Schoemann, & Lim, 2015). Items are scored from 0 to 3 with higher scores denoting greater symptom severity (Ritschel et al., 2015). The DASS has strong correlations with other measures of depression and anxiety (Lovibond & Lovibond, 1995). Only the subscale score for general anxiety (DASS-GA) was used in the current study. In our sample, the DASS-GA showed acceptable internal reliability (α =.77).

Reading the Mind in the Eyes Test, Revised (MIE). This is a behavioral task used to measure cognitive empathy in nonpsychiatric individuals (Baron-Cohen et al., 2001). Participants are presented with 36 black-and-white photographs of only the eye region of adult faces and asked to select what the person is feeling or thinking from a list of four possible adjectives (Baron-Cohen et al., 2001). In the current study, this task was completed online along with the self-report measures. The total number of correct answers was used for analyses.

Procedure

Analyses were conducted on an archival dataset collected as part of a larger online study from Georgia State University, which was approved by that institution's Institutional Review Board. Participants provided informed consent and then completed demographic questions along with the measures described above as part of a larger battery of online questionnaires. Participants received academic credit toward a Psychology Department course in return for their participation. The relationships of the empathy variables with social anxiety (i.e., FNE score) have not been previously reported or published.

Statistical Analyses

Due to the large sample size, we first examined dimensional variables for statistical outliers as defined by Z score greater than or less than 3.0 and excluded these participants from the analyses (N = 25; 6 from IRI subscales, 7 from MIE task, 12 from DASS-GA). In addition, three participants were excluded for missing data for the DASS. This resulted in the 684 participants included in the analyses and described in the Participants section. In this final sample, all dimensional variables showed a reasonable approximation of a normal distribution, as skewness and kurtosis values were all less than 1.18.

To address our hypotheses, we used a mixed ANCOVA to simultaneously examine the main effects of the emotional empathy measure (IRI-EC) and the two cognitive empathy measures (IRI-PC and the MIE total score), as well as their interactions with biological sex, on the FNE total score, while covarying for the DASS-GA score. We covaried for the DASS-GA score to reduce the likelihood that any relationship was not secondary to general anxiety, as we were interested in the specific subtype of social anxiety.

RESULTS

See Table 1 for descriptive statistics and zero-order correlations of the measures. The results of the mixed ANCOVA revealed an interaction between biological sex and one of the cognitive empathy measures – the MIE task – on the FNE total score, $F(1,675) = 5.01$, $p = .03$, $\eta^2 = .01$. To examine the simple effects of this interaction, an ANCOVA, covarying for DASS-GA, was conducted within each sex to examine the effect of only the MIE predictor on the FNE total score. The main effect for MIE was statistically significant in women, $F(1,519) = 6.74$, $p = .01$, $\eta^2 = .01$, as women with higher social anxiety performed better on the MIE task (see Figure 1), but the main effect was not significant in the men, $F(1,159) = 0.72$, $p = .40$, $\eta^2 = .004$. The remaining main effects and interactions from the primary ANCOVA were not statistically significant (all ps > .08), although the covariate DASS-GA score showed a significant positive relationship with the FNE score, $F(1,675) = 107.52$, $p < .001$, $\eta^2 = .14$.

DISCUSSION

Our hypothesis was partially supported. There was an interaction between biological sex and cognitive empathy on social anxiety in that scores on the MIE cognitive empathy task positively related to social anxiety severity in women (see Figure 1). This relationship was not statistically significant in the men. Results were consistent with the Sutterby and colleagues (2012) study, including the specificity of the finding to women. Although there were two cognitive empathy measures in the present study, only the MIE task displayed a significant main effect for social anxiety. A potential reason is that our second cognitive empathy measure, IRI-Perspective Taking, relies on self-report while the MIE task is an objective behavioral measure. The objective MIE score may show more sensitivity to individual differences for which participants may not have adequate self-awareness to accurately self-report in the IRI_PT scale. Similarly, the Sutterby and colleagues (2012) study used the same MIE test along with a second behavioral measure of cognitive empathy not used in the present study. Thus, the current study partially replicated findings from Sutterby and colleagues (2012) but with a notably larger independent sample, and expanded those findings by covarying for general anxiety. This appears to be the only other study to examine the moderation of biological sex with empathy in relation to social anxiety. The results of the current study are also broadly consistent with other studies that did not examine sex interaction but found positive relationships between cognitive empathy and social anxiety in nonpsychiatric samples (Auyeung & Alden, 2016; Tibi-Elhanany & Shamay-tsoory, 2011).

Social anxiety directly relates to how we perceive others and our surroundings; it is possible that one contributing factor to social anxiety is the way people assess their surroundings (i.e., the emotions of others). When people are more socially anxious, their ability to react to and

recognize facial cues may be heightened because of the anxiety. The social anxiety relationship with performance on the MIE task was consistent with this theory. However, our finding was specific to women. Theoretically, this may be because women tend to be more accurate than men in identifying emotions in others (Doherty, Orimoto, Singelis, Hatfield, & Hebb, 1995; Michalska, Kinzler, & Decety, 2013; Christov-Moore, Simpson, Coudé, Grigaityte, Iacoboni, & Ferrari, 2014). In addition to this general sex difference, the results of this study suggest that women with higher levels of social anxiety may be even more accurate in identifying emotions from facial expressions than other women. This occurred even when controlling for general anxiety, suggesting it may be somewhat specific to social anxiety. It is possible that we did not find this relationship in men because they may assess social situations and/or experience social anxiety differently than women. Findings on sex differences in functional/social impairment are mixed in SAD studies (Asher, Asnaani, & Aderka, 2017). Men are also diagnosed with SAD less often than women (American Psychiatric Association, 2013).

Contrary to the hypothesis, emotional empathy did not relate to social anxiety. There was no main effect, nor an interaction with biological sex, for emotional empathy. The lack of a main effect is inconsistent with some studies (Morrison, Mateen, Brozovich, Zaki, Goldin, Heimberg, & Gross, 2016; Tibi-Elhanany & Shamay-tsoory, 2011). A possible reason for the inconsistency is that Morrison and colleagues' (2016) study contained a sample of participants with SAD as compared to nonpsychiatric controls. Morrison and colleagues (2016) also did not use the same IRI subscale to measure affective empathy. Similarly, the inconsistency with the Tibi-Elhanany and Shamay-tsoory (2011) study could be attributed to the difference in the size and demographics of the two nonpsychiatric samples - the current study had a substantially larger

sample and was younger overall. Another potential reason is the difference in measures of both social anxiety and affective empathy between the studies.

The current study was limited by sample composition, as participants were university students and the large majority were young adults. Future studies should aim to collect a more diverse sample to assess whether results generalize across age ranges and education levels. Generalizability in diverse samples allows us to be more confident that our results are applicable to the population and not just specific to university students. An additional limitation of the sample was that it was 77% female. This allowed for more statistical power to find relationships in the women. However, the sample included 162 men, which provided adequate statistical power to detect small-to-medium effect sizes. In addition, the variability and range of scores was similar for the women and men across all variables. Moreover, the sex interaction was a replication of an independent sample reported in an earlier study (Sutterby et al., 2012). Another limitation is that the study was completed online. Although indviduals who completed the measures in an unusually fast manner and statistical outliers were excluded, it is still possible some of the remaining participants did not adequately attend to items on the measures. Despite these limitations, the findings from the current study, along with existing literature, suggest that females self-reporting higher levels of social anxiety perform better on a behavioral measure of cognitive empathy (i.e., the MIE task). Future research could expand on these findings by assessing individuals with social anxiety disorder. If the findings are replicated this could help us know whether these relationships also exist in individuals with more severe social anxiety. Researchers should also aim to replicate the study with a more diverse group of participants. Replication in such samples could inform assessment and treatment by helping psychologists determine diagnoses. Moreover, this could provide valuable insight to the individual's behavior,

skills, thought, and personality, leading to a more effective treatment plan. These changes could facilitate tailored interventions for both men and women with SAD.

Table 1

Descriptive Statistics and Zero-Order Correlations for Study Measures.

		1	2	3	4	5
1	FNE	14.04 (8.53)				
2	IRI_Perspective Taking	-.061	17.37 (4.54)			
3	IRI_Empathic Concern	.039	.46***	19.81 (4.47)		
4	MIE Score	.032	.14***	.12**	24.05 (4.02)	
5	DASS-GA	.38***	-.094*	-.014	-.093*	6.40 (6.36)

IRI = Interpersonal Reactivity Index; MIE = Reading the Mind in the Eyes Task; DASS-GA = Depression Anxiety Stress Scale - General Anxiety Scale; FNE = Fear of Negative Evaluation Scale

Descriptive statistics on the outer diagonal in format: mean (standard deviation); remaining values are Pearson's or point-biserial *r* values.

*p < .05, **p < .01, *** p < .001

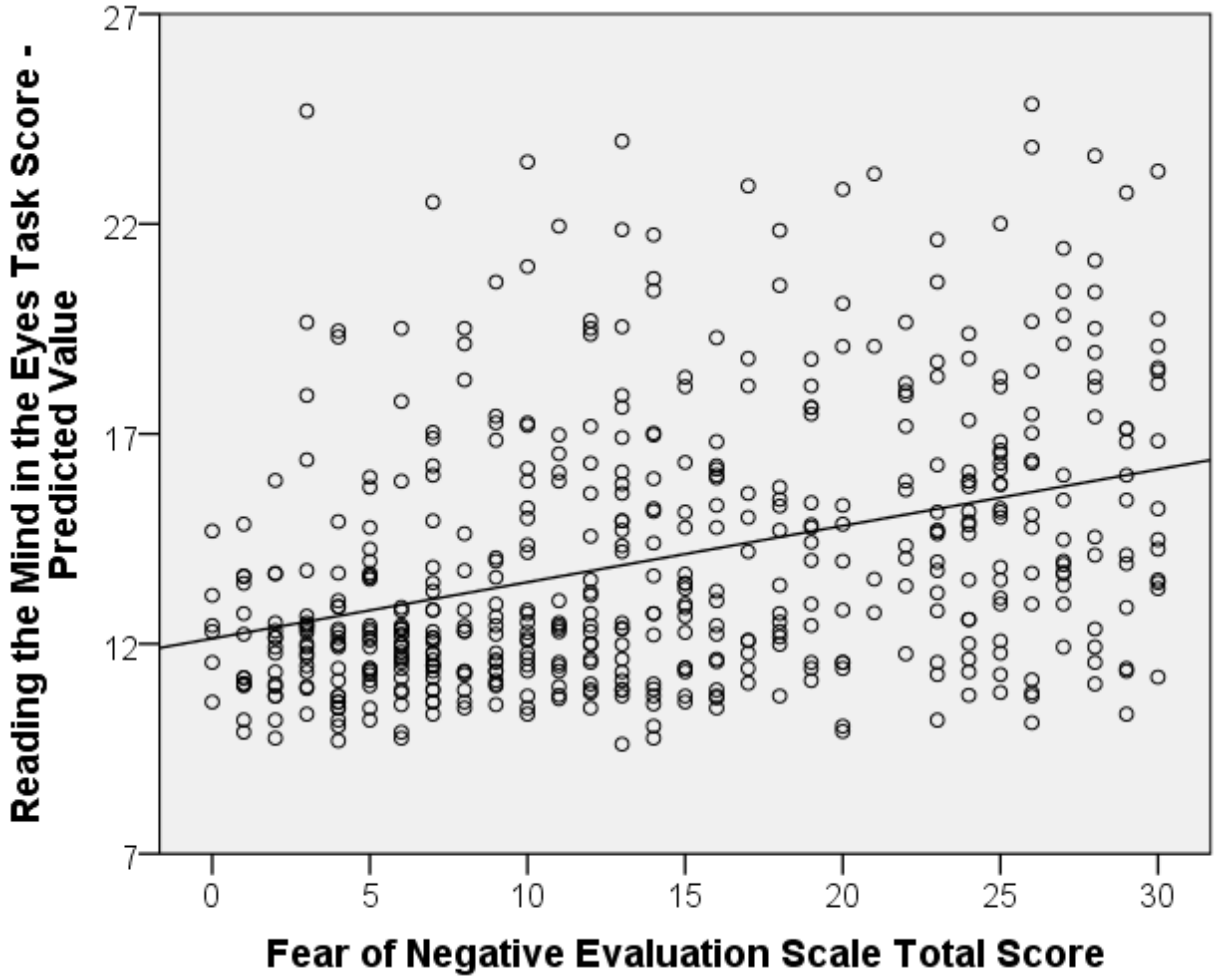

Figure 1: Scatterplot of the relationship between social anxiety and cognitive empathy performance in female participants.

Note: The Reading the Mind in the Eyes Score is the Predicted Value after covarying for general anxiety (DASS-GA)

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